STATION CIRCULAR 92 MAY, 1929

The Oregon Apple-washer

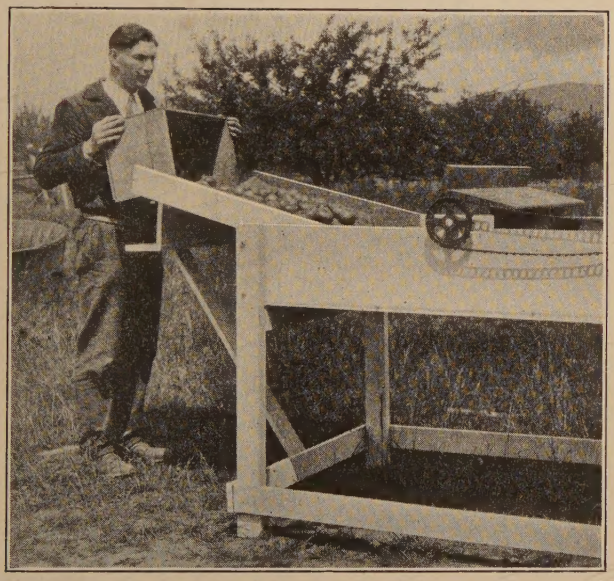

Fig. 1. Rear view of the machine.

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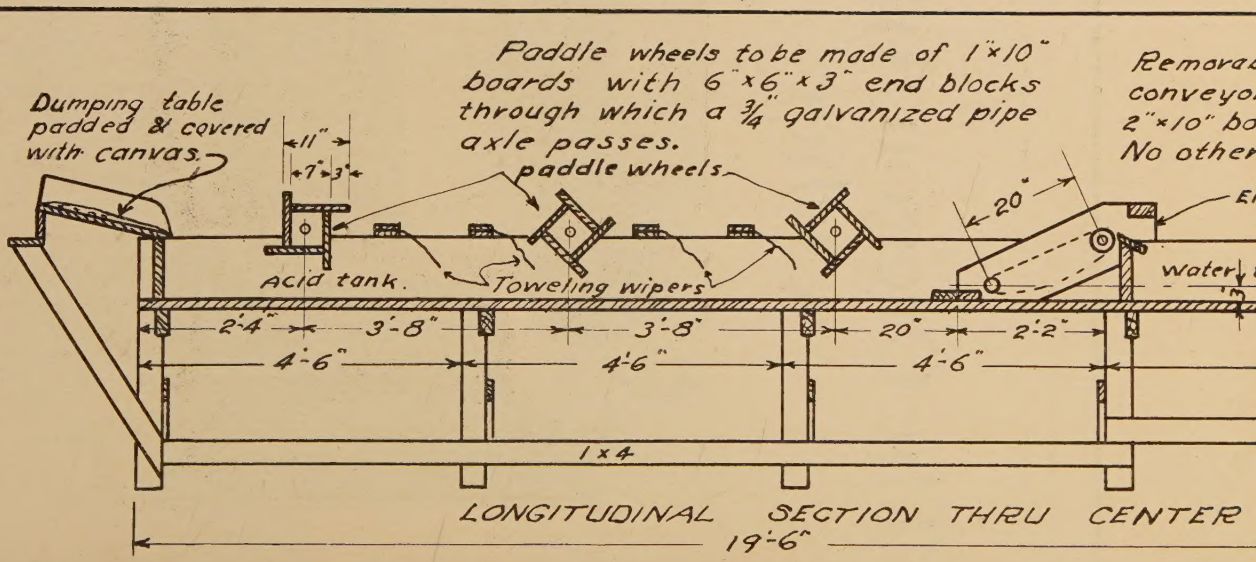
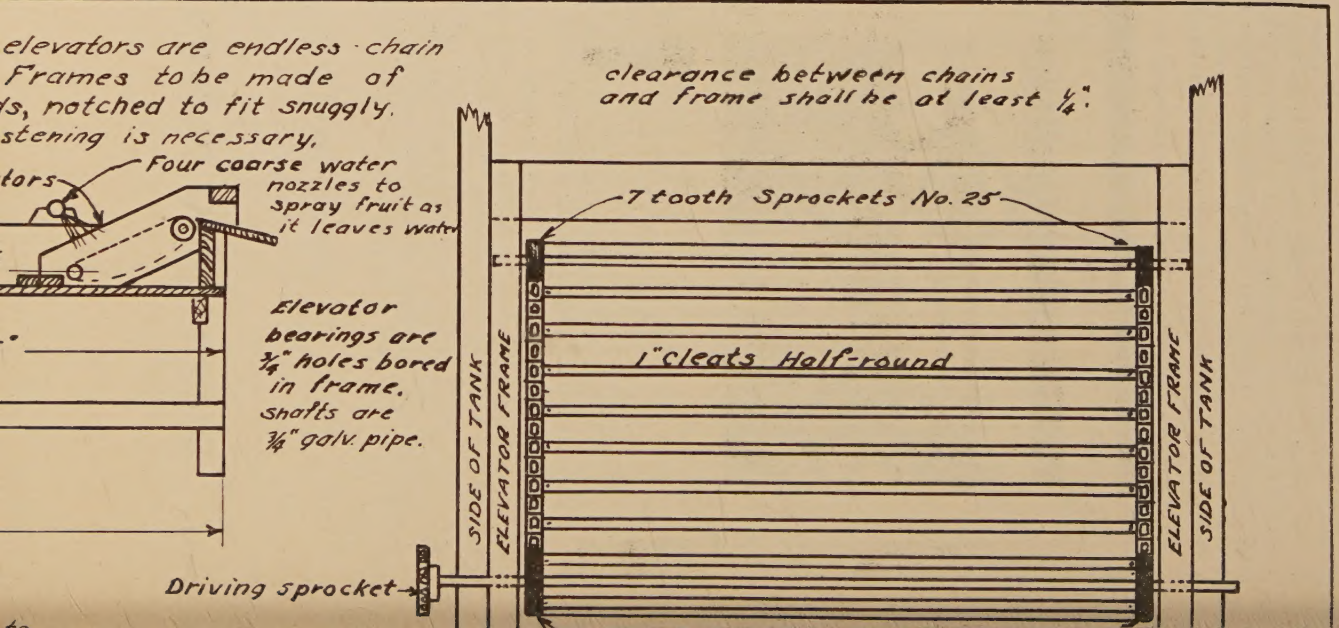


Elevators and paddles to turn approximately 4 R
power required – ½ h.p. motor or 1½ hp gas engi


elevators are endless chain
Frames to be made of
ds, notched to fit snuggly.
stening is necessary,
tors
Four coarse water nozzles to spray fruit as it leaves water
Elevator bearings are 3/4" holes bored in frame. Shafts are 3/4" galv. pipe.
clearance between chains and frame shall be at least 1/4".
7 tooth Sprockets No. 25
1" cleats Half-round
SIDE OF TANK
ELEVATOR FRAME
ELEVATOR FRAME
SIDE OF TANK
Driving sprocket

The Oregon Apple-washer

By

Henry Hartman

The apple-washing machine described here was designed and constructed to meet the numerous and urgent reguests from growers who desire to build their own washing equipment. Introduced by the Oregon Agricultural Experiment Station in 1927, it is now in use in many of the apple sections where washing has become a standard practice. When properly constructed and properly operated, it has proved to be efficient and economical and to be adapted to both large and small operations.

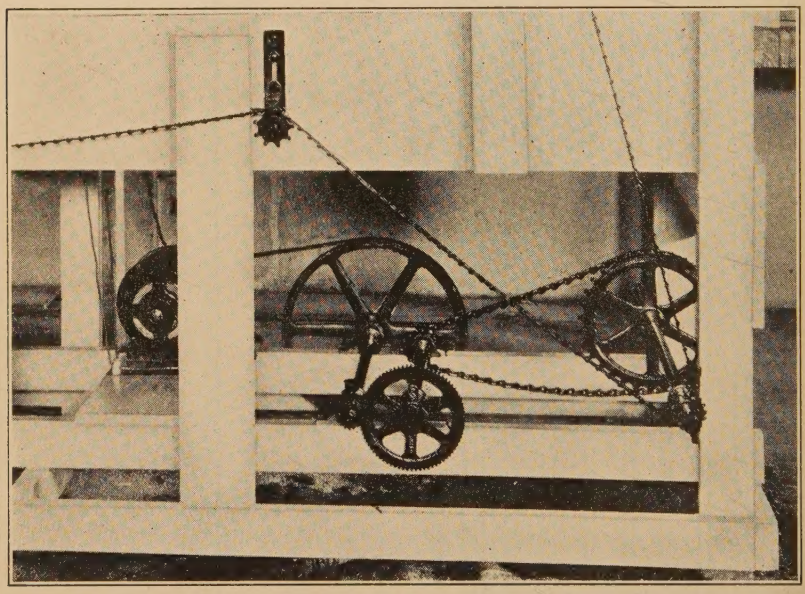


Fig. 3. Motor and speed-reduction mechanism.

Principle. As shown by the illustrations, the machine is of the flotation type. It consists essentially of a two-compartment tank, one compartment for the washing solution and another for the rinse or fresh water bath. The fruit is propelled on the surface of the liquid by paddle-wheels and is lifted out by endless-chain elevators. No attempt has been made to provide a drying unit for this machine. The fruit can be dried by natural means or it can be dried with one of the drying devices now offered for sale by some of the manufacturers of washing equipment.

Construction. The machine is of simple construction and can be built by any one who has an elementary knowledge of mechanics. It is made almost entirely of wood, a desirable feature since wood is resistant to hydrochloric acid, the cleaning agent most commonly used.

In the construction of the acid unit all the rods should be on the outside. All bolts should be imbedded in the wood so that they do not come in contact with the acid solution. All nails should be countersunk, and the heads should be covered with material such as beeswax, grafting wax, coal tar, or paraffin. The tanks should be painted with linseed-oil or varnish. Lead paint should not be used since it is destroyed by the action of the acid. Duco and lacquer are fairly satisfactory. All metal parts such as sprocket wheels and sprocket chain should be painted with asphaltum paint.

Elevators. The elevators are endless-chain conveyors attached to removal frames. The conveyors themselves are made of half-round hardwood cleats, riveted to No. 25 or No. 31 metal-link belting. Each conveyor travels on four metal sprocket wheels attached to metal shafts at the top and at the bottom of the frame. Power is transmitted to the conveyors through the upper shafts.

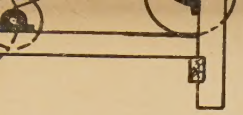
Ample clearance should be provided in the construction of the elevators so as to allow for swelling when the tanks and frame absorb moisture. The frames should be loose enough at all times so that the elevators can be removed. This is necessary to permit cleaning of the tanks and to protect the chains and sprocket wheels from the acid when the machine is not in use. In case the elevators do not hold in place of their own accord, they can be secured by driving temporary wooden wedges between the frames and the sides of the tanks.

Towel wipers. The towel wipers in the acid compartment serve several purposes and add considerably to the efficiency of the machine. First, they hold the fruit and prevent it from going through too rapidly. Second, they turn the fruit as it passes through the tank. Third, they deposit acid solution on the part of the fruit that travels above the liquid. These wipers consist merely of cotton toweling, cut in shreds at the bottom and draped across the braces of the tanks so that the shredded ends dip from one to two inches into the solution. They are held in place by strips of wood laid over the braces.

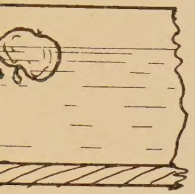
Driving mechanism. The machine can be driven by either a one-half horse-power electric motor, or a one and one-half horse-power gasoline engine. The paddle-wheels should rotate at a speed of approximately four revolutions per minute. The speed of the electric motor or engine can be reduced by means of a reduction device made from chain and pulleys of various sizes. The reduction device can be purchased as standard equipment or it can be made up from second-hand material obtained from discarded spray equipment or other pieces of machinery.

The rinsing unit. Since rinsing is an important and essential feature of washing operations special attention must be given to the rinsing unit. As shown in the illustrations, the fruit is dropped into still water as it comes from the acid unit and then is given a thorough spray of clean water on the elevator. The latter feature is necessary since a mere plunge into still water does not remove all the acid.

Capacity. The speed at which the fruit travels through the machine is governed by the amount of fruit that is fed into it, rather than by the speed of the paddle-wheels and elevators. This is due to the fact that the towel wipers in the acid section hold the fruit back, so that it does not go through until the entire surface is covered and until an excess amount has come into the machine. In other words, the fruit stays in the machine until it is pushed out by new fruit coming in. This offers an easy method of



" (not nailed down)
Toweling



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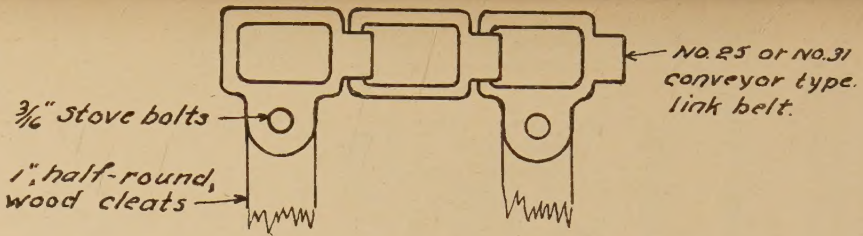

DETAIL OF ENDLESS-CHAIN CONSTRUCTION.

FRUIT WASHER

DETAILS & SPECIFICATIONS

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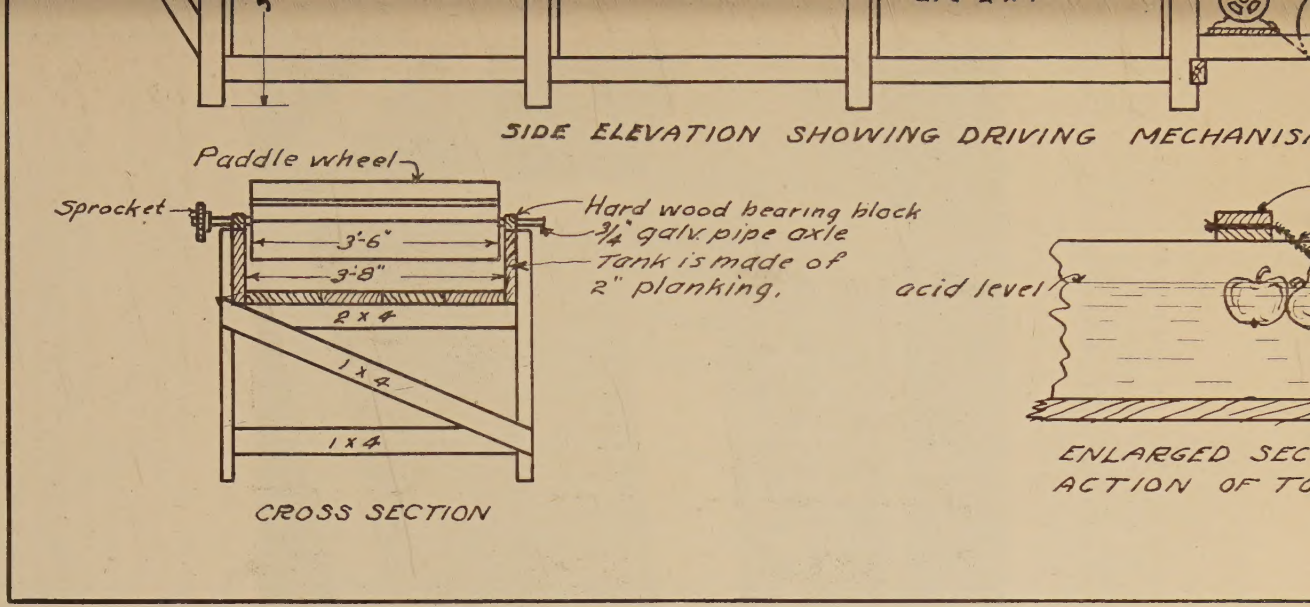

Fig. 2. Details and sp

timing the cleaning operation. With an acid unit 14 feet long and three feet eight inches wide, the machine holds approximately five packed boxes of apples at any one time. If the fruit is to be kept in the acid bath five minutes, the machine should be fed at the rate of about one packed box per minute or 60 packed boxes per hour. When less than five minutes of treatment are required the speed of the operation can be increased.

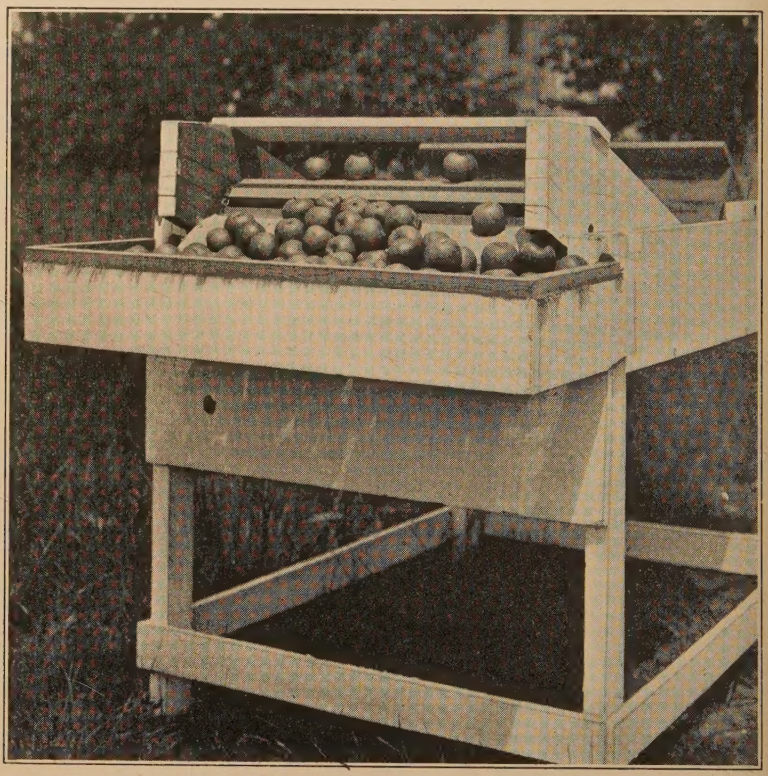

Fig. 4. Front view showing the elevator of the rinsing unit.

Operating the machine. The machine does its best work when fed at a uniform and constant rate. It will not work well if the fruit is dumped in in large quantities at one time. The feeding should be so regulated that the elevators are never jammed with fruit.

As the fruit passes through the acid unit a certain amount of the washing solution is carried away and it is necessary to add water and acid from time to time. The acid compartment must be kept sufficiently full so that the paddle-wheels, the towel wipers, and the elevator all work properly. The loss of washing solution owing to carry-over is approximately 30 gallons for every car of fruit washed. The method of replenishing the acid bath from a barrel of stock solution has proved to be satisfactory.

Note: For full information regarding the washing of fruit see Oregon Agricultural Experiment Station Bulletin 234, "The Removal of Spray Residue from Apples and Pears," by Henry Hartman, R. H. Robinson, and S. M. Zeller.